Tree Management Strategies

Arboricultural Impact Assessment

EARLY WORKS PROJECT
AT WESTMEAD HOSPITAL
6-10-22

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Contents

Summary

Tree Management Strategies have been commissioned on behalf of Health Infrastructure NSW to provide an Arboricultural Impact Assessment (AIA) for three groups of trees and sixty individual trees as part of an Early Works Project. The report forms part of a Review of Environmental Factors (REF).

This report has been prepared as part of a Review of Environmental Factors for the Early Works Project at Westmead Hospital which proposes a series of infrastructure improvements to accommodate the future development of the Integrated Mental Health Complex (proposed separately as part of State Significant Development Application SSD-44034342).

The purpose of this report is to assess the potential environmental impacts which could arise from the proposed works, which include:

- Demolition of the existing Brain Injury Rehabilitation Unit building, Casuarina Lodge and office buildings;
- Diversion of existing in-ground sewer and water services;
- Construction of a new access way to the P14 staff car park;
- Flood mitigation works; and
- Bulk earthworks and tree removal to accommodate the carrying out of the above works.

The proposed works will be carried out within the boundaries of Westmead Hospital, which is located approximately 1.5km north-west of the Parramatta Central Business District (CBD), the primary metropolitan centre of Western Sydney. The site is legally described as Lot 1 DP1194390 and Lot 4 DP 1077852, with works proposed in the central part of the precinct.

An Arboricultural Impact Assessment was prepared by Tree Management Strategies as part of a State Significant Development Application (SSDA). The nominated (SSDA) trees highlighted on the Tree Impact Plan (Appendix 2) do not form part of this assessment, however, they have been discussed here to form a holistic assessment of the potential impacts of tree removal on site. The SSDA excludes 16 individual trees, twenty-seven trees within Group 1, six trees within Group 2 and nineteen trees within Group 3 from this assessment.

The Health, Condition, Retention Value and General data of 60 individual trees and three groups of trees is displayed in the Tree Data Schedule (Appendix 1).

The developmental Impacts are shown in the Tree Impact Plan (Appendix 2) and are explored in (Section 2) Developmental Impacts, of this report.

The Tree Management Plan (Section 4) offers detailed design modifications or sensitive construction methods and a step-by-step timeline for Tree Protection Measures to protect trees to be retained.

Conclusion

The proposed demolition and sewer diversion works requires the removal of 37 trees, refer to the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2).

With tree protection measures allowed for, Trees 1, 2, 28, 29, 34, 35, 36, 37, 54 and 55 will remain healthy and viable into the future, refer to the Tree Management Plan (Section 4) of this report.

The Landscape Plan Prepared by *Site Design* proposes the planting of 78 trees that adequately compensates for recommended tree removals.

Recommendations

- Remove 37 trees, refer to the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2). Tree removal work to be undertaken in accordance with the relevant Australian Standard for the Pruning of Amenity Trees, using a qualified Arborist (minimum Australian Qualification Framework (AQF3) Level Arborist).

- Adhere to the Tree Management Plan (Section 4) of this report to ensure the ongoing health and vitality of all Trees 1, 2, 28, 29, 34, 35, 36, 37, 54 and 55 to be retained.

1. Introduction

Tree Management Strategies have been commissioned on behalf of Health Infrastructure NSW to provide an Arboricultural Impact Assessment (AIA) for three groups of trees and sixty individual trees as part of an Early Works Project. The report forms part of a Review of Environmental Factors (REF).

1.1 Project Scope

This report has been prepared as part of a Review of Environmental Factors for the Early Works Project at Westmead Hospital which proposes a series of infrastructure improvements to accommodate the future development of the Integrated Mental Health Complex (proposed separately as part of State Significant Development Application SSD-44034342).

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The proposed works will be carried out within the boundaries of Westmead Hospital, which is located approximately 1.5km north-west of the Parramatta Central Business District (CBD), the primary metropolitan centre of Western Sydney. The site is legally described as Lot 1 DP1194390 and Lot 4 DP 1077852, with works proposed in the central part of the precinct.

1.2 Heritage Consideration

To determine whether any tree has been assessed as a significant heritage item by Paramatta Council. A search of the Parramatta Local Environmental Plan (LEP) NSW Legislation Appendix 9 Heritage Conservation and the Development Control Plan (DCP) Part 9 was completed. No significant heritage tree is registered or documented in any of the documents mentioned above. Furthermore, the National Trust of Australia advises that significant heritage trees are registered with the LGA, and proponents of a development will be notified by the governing authority if the development site contains a tree of significance.

1.3 Aim

This report aims to:

- Assess the Health, Condition and Retention value of three groups of trees and sixty individual trees on the subject site.
- Calculate the impact the proposed development will have on all trees assessed.
- Recommend the retention, removal or protection of trees on the subject site.

2. Grouped Trees

A site inspection was conducted on the 8-11-21. Due to the large quantity of tree species in three areas of the site, the decision to (Group) together these area's was made, refer to the Tree Impact Plan (Appendix 2). The remaining sixty trees were individually assessed, their Health, Condition, Retention Value, General data and photographs are displayed in the Tree Data Schedule (Appendix 1).

Group 1 - 28 Trees

The Group 1 tree species shown in (Table 1) and (Figure 1) are a majority of River Oaks of varying health and condition. The trees within Group 1 are given a medium retention value due to their age, health and position in the landscape, refer to the Tree Impact Plan (Appendix 2).

Table 1: Tree Species

Scientific Name	Common Name
Eucalyptus maculata	Spotted Gum
Eucalyptus punctata	Grey Gum
Casuarina cunninghamiana	River Oak

Figure 1: Group 1

Figure 2: Depicts Group 1 highlighted in green

Group 2 – 6 Trees

The Group 2 tree species shown in (Table 2) and (Figure 2) are River Oaks of similar health and condition. The trees within Group 2 are given a medium retention value due to their age, health and position in the landscape, refer to the Tree Impact Plan (Appendix 2).

Table 2: Tree Species

Scientific Name	Common Name
Casuarina cunninghamiana	River Oak

Figure 2: Group 2

Figure 2: Depicts Group 2 highlighted in green

Group 3 – 19 Trees

The Group 3 tree species shown in (Table 3) and (Figure 3) are a majority of River Oaks of varying health and condition. The trees within Group 3 are given a medium retention value The trees within Group 3 are given a low retention value due to their age, health and position in the landscape, refer to the Tree Impact Plan (Appendix 2).

Table 2: Tree Species

Scientific Name	**Common Name**
Casuarina cunninghamiana	River Oak

Figure 3: Group 3

Figure 2: Depicts Group 1 highlighted in green

3. Developmental Impacts/Observations

An Arboricultural Impact Assessment was prepared by Tree Management Strategies as part of a State Significant Development Application (SSDA). The nominated (SSDA) trees highlighted on the Tree Impact Plan (Appendix 2) do not form part of this assessment, however, they have been discussed here to form a holistic assessment of the potential impacts of tree removal on site. The SSDA excludes 16 individual trees, twenty-seven trees within Group 1, six trees within Group 2 and nineteen trees within Group 3 from this assessment.

This assessment is based on the plans shown in the Referenced Document (Section 5) of this report.

Tree retention values are in accordance with IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©, refer to the Method (Appendix 3).

The Tree data schedule (Appendix 1) and Tree Impact Plan (Appendix 2), highlight the retention value and Tree Preservation Zone (TPZ) incursions of the (REF) trees assessed within the subject site and neighbouring properties.

As per the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2), 27 trees given a low retention value have a total encroachment into to their TPZ's by the proposed demolition and sewer diversion works which requires their removal.

As per the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2), 10 trees given a medium retention value have a total incursion into their TPZ's by the proposed demolition and sewer diversion works which requires their removal.

As per the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2), Trees 1, 2, 28, 29, 34, 35, 36, 37, 54 and 55 are unaffected by the development, however, will require tree protection measures to ensure their health and longevity throughout construction, refer to the Tree Management Plan (Section 4) of this report.

The Landscape Plan prepared by *Site Design* proposes the planting of 78 trees to compensate for tree removals.

4. Tree Management Plan

The Tree Management Plan is designed to offer detailed design modifications or sensitive construction methods and a step-by-step timeline for Tree Protection Measures.

Step 1: Confirm trees to be removed

The Project Arborist must confirm with spray paint and or florescent tape the trees to be removed, refer to the Tree Data Schedule (Appendix 1).

Step 2: Erect Tree Protection Fence

Trees 1, 2, 28, 29, 34, 35, 36, 37, 54 and 55 require tree protection fencing to be erected to ensure their preservation throughout construction. The fence detailed in (Figure 4) needs to be erected throughout construction and may be dismantled when landscaping begins. The Project Arborist must certify the protection measures are installed in a practicable location to the specifications prior to commencement of construction.

Figure 4: Tree Protection Fence Detail

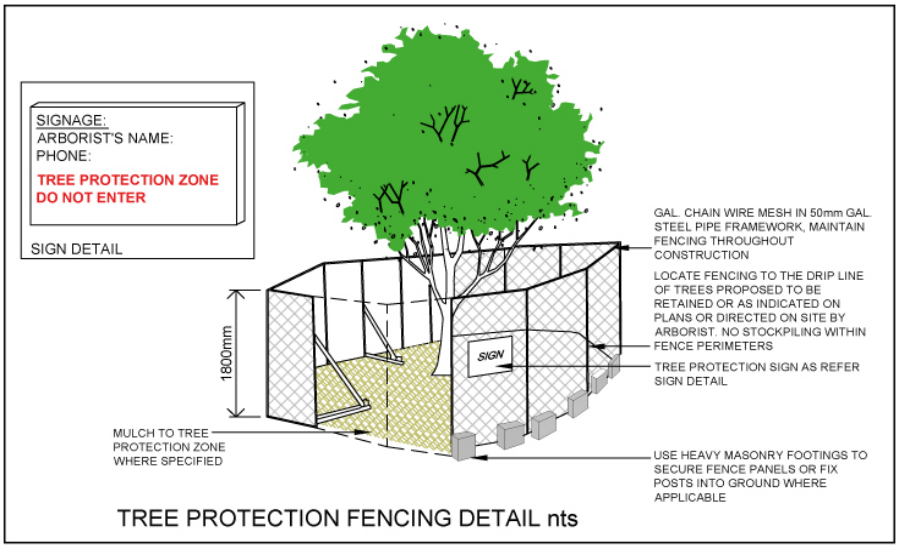


Figure 4: Tree Protection fence detail (CSA 2009).

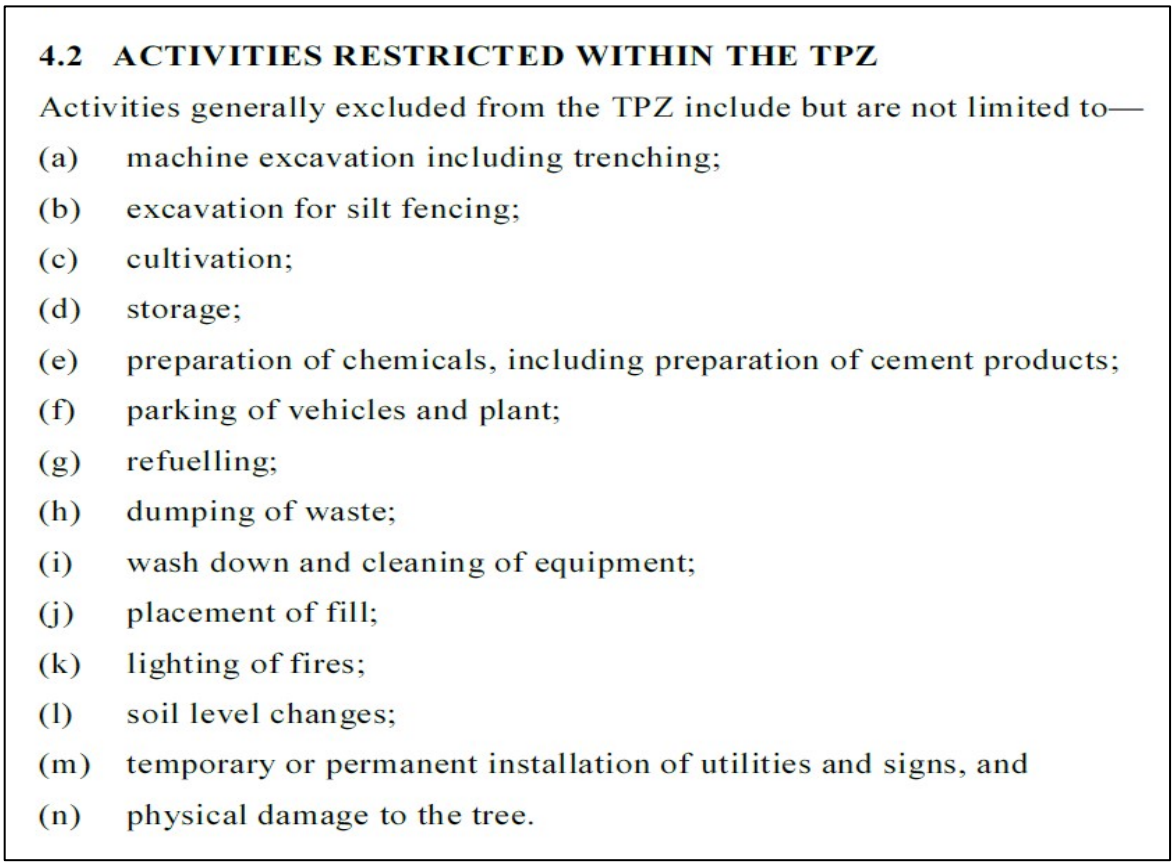
Step 3: Monitoring

The Project Arborist must inspect all trees to be retained bi-monthly to ensure tree protection measures are being adhered to and the health of all trees is not being adversely affected.

Step 4: General Exclusions within the TPZ

The following activities shall be excluded within the TPZ, refer to (Figure 5).

Figure 5: TPZ Exclusions



4.2 ACTIVITIES RESTRICTED WITHIN THE TPZ

Activities generally excluded from the TPZ include but are not limited to—

(a) machine excavation including trenching;
(b) excavation for silt fencing;
(c) cultivation;
(d) storage;
(e) preparation of chemicals, including preparation of cement products;
(f) parking of vehicles and plant;
(g) refuelling;
(h) dumping of waste;
(i) wash down and cleaning of equipment;
(j) placement of fill;
(k) lighting of fires;
(l) soil level changes;
(m) temporary or permanent installation of utilities and signs, and
(n) physical damage to the tree.

Figure 5: Activities Restricted within the TPZ. Exert from 'AS4970 Protection of Trees on Development Sites'.

The Project Arborist must be notified in the event any disturbance within the TPZ of trees to be retained is required.

Step 5: Final Certification

Upon completion of construction the Project Arborist will certify that the health and condition of all trees to be retained have not been adversely affected by the development.

5. Referenced Documents

Plans that were referred to for this report include:

Plan Title	Drawing Number	Consultant	Revision
Proposed Site Plan	IMHC-AR-DG-0120	Jacobs	18-7-22 10
Landscape Site Plan	IMHC-LS-DG-0001	Jacobs	25-7-22 2
Civil	IMHC-CV-DG-1001 to IMHC-CV-DG-1801	Jacobs	29-7-22

6. Conclusions & Recommendations

Conclusion

The proposed demolition and sewer diversion works requires the removal of 37 trees, refer to the Tree data schedule (Appendix 1) and the Tree Impact Plan (Appendix 2).

With tree protection measures allowed for, Trees 1, 2, 28, 29, 34, 35, 36, 37, 54 and 55 will remain healthy and viable into the future, refer to the Tree Management Plan (Section 4) of this report.

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7. References

Shigo, A., 1986, A New Tree Biology and Dictionary: facts, photos, and philosophies on trees and their problems and proper care, Snohomish, WA

Council of Standards Australia (August 2009)
The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009).

Harris, R., Clark, J., Matheny, N., 2003, Integrated Management of Landscape Trees, Shrubs, and Vines, fourth edition, Prentice Hall, Australia

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

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Mattheck, C and Breloer, H (1994) *The Body Language of Trees*. Research for Amenity Trees No.4,
The Stationery Office, London.

8. Appendices

Appendix 1: Tree Data Schedule

Tree Management Strategies

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
1	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	0	Fair/Poor	Fair/Poor	Medium	Low	Low	Unaffected	
2	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	0	Fair/Poor	Fair/Poor	Medium	Low	Low	Unaffected	
3	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	

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4	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
5	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
6	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	

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7	Eucalyptus punctata	Grey Gum	0.18	0.12	1.61	1.44	10.00	Young	1.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
8	Eucalyptus punctata	Grey Gum	0.70	0.60	2.85	7.20	15.00	Mature	6.00	100	Fair	Fair/Poor	Medium	Medium	Medium	Remove	
9	Casuarina cunninghamiana	River She-Oak	0.39	0.31	2.23	3.72	15.00	Mature	4	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

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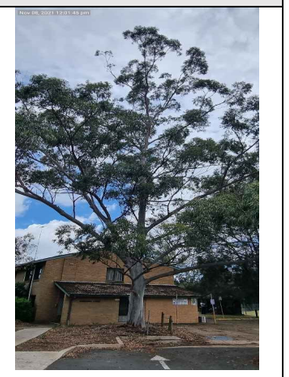
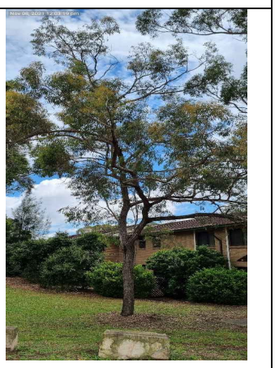
10	Eucalyptus saligna	Sydney Blur Gum	0.85	0.72	3.09	8.64	18.00	Mature	10.00	100	Fair	Fair/Poor	Medium	Medium	Medium	Remove	
11	Eucalyptus sideroxylum	Iron Bark	0.33	0.26	2.08	3.12	14.00	Semi Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
12	Angophora costata	Sydney Red Gum	0.15	0.12	1.49	1.44	5.00	Young	1.00	100	Fair	Poor	Medium	Low	Low	Remove	

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13	Angophora costata	Sydney Red Gum	0.15	0.12	1.49	1.44	5.00	Young	1.00	-	Fair	Poor	Medium	Low	Low	Assessed as part of the SSDA	
14	Angophora costata	Sydney Red Gum	0.15	0.12	1.49	1.44	5.00	Young	1.00	-	Fair	Poor	Medium	Low	Low	Assessed as part of the SSDA	
15	Eucalyptus punctata	Grey Gum	0.15	0.20	1.49	2.40	12.00	Semi Mature	2.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

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16	Eucalyptus punctata	Grey Gum	0.15	0.20	1.49	2.40	12.00	Semi Mature	2.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
17	Eucalyptus punctata	Grey Gum	0.15	0.20	1.49	2.40	12.00	Semi Mature	2.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
18	Eucalyptus punctata	Grey Gum	0.15	0.20	1.49	2.40	12.00	Semi Mature	2.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

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19	Eucalyptus punctata	Grey Gum	0.15	0.20	1.49	2.40	12.00	Semi Mature	2.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
20	Eucalyptus punctata	Grey Gum	0.50	0.44	2.47	5.28	15.00	Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
21	Jacaranda mimosifolia	Jacaranda	0.40	0.35	2.25	4.20	10.00	Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

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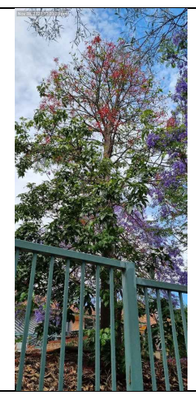
22	Jacaranda mimosifolia	Jacaranda	0.40	0.35	2.25	4.20	10.00	Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
23	Jacaranda mimosifolia	Jacaranda	0.40	0.35	2.25	4.20	10.00	Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
24	Brachychiton acerifolius	Jacaranda	0.32	0.29	2.05	3.48	10.00	Mature	3.00	100	Fair	Fair	Medium	Low	Low	Remove	

Tree Management Strategies

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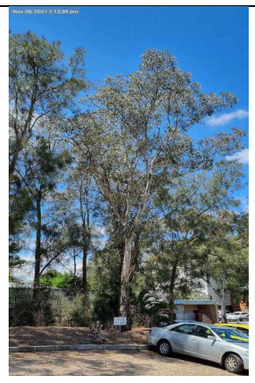
25	Acacia sp	Wattle	0.39	0.45	2.23	5.40	8.00	Mature	6.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
26	Corymbia maculata	Spotted Gum	0.50	0.60	2.47	7.20	15.00	Mature	5.00	100	Fair	Fair	Medium	Medium	Medium	Remove	
27	Eucalyptus punctata	Grey Gum	0.45	0.40	2.37	4.80	15.00	Mature	5.00	100	Fair	Fair	Medium	Medium	Medium	Remove	

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28	Melaleuca linarifolia	Paper Bark	0.45	0.55	2.37	6.60		Semi Mature	4	-	Fair/Poor	Fair/Poor	Medium	Low	Low	Unaffected	
29	Eucalyptus eximia	Yellow Blood Wood	0.30	0.40	2.00	4.80	12.00	Mature	2.00	-	Fair	Fair/Poor	Medium	Low	Low	Unaffected	
30	Eucalyptus scoparia	Willow Gum	0.50	0.42	2.47	5.04	18.00	Mature	5.00	100	Fair/Poor	Fair/Poor	Medium	Medium	Medium	Remove	

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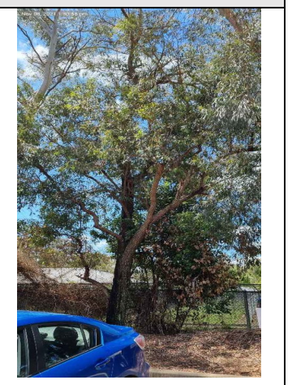
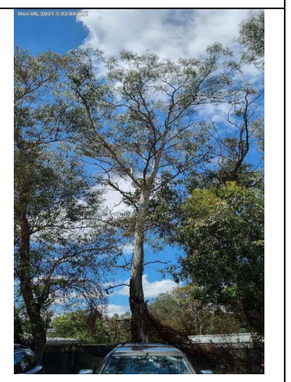
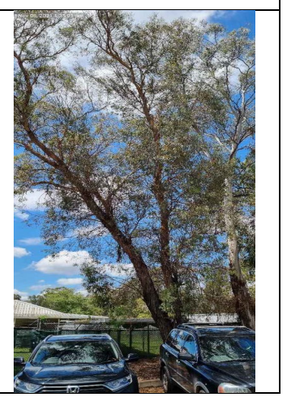
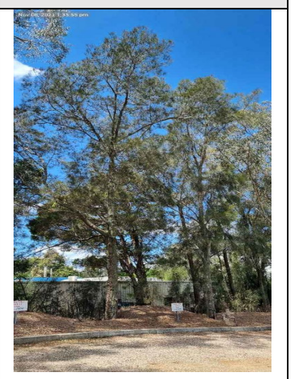
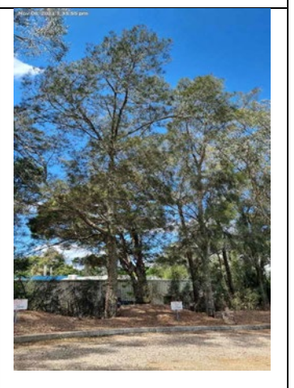
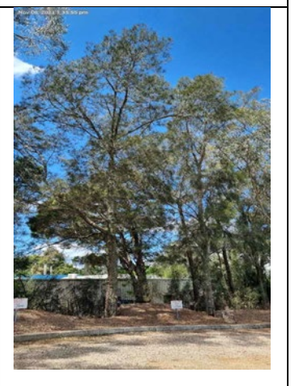
31	Eucalyptus eximia	Yellow Blood Wood	0.39	0.32	2.23	3.84	14.00	Semi Mature	3.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
32	Eucalyptus scoparia	Willow Gum	0.30	0.40	2.00	4.80	15.00	Mature	4.00	100	Fair/Poor	Fair/Poor	Medium	Low	Low	Remove	
33	Eucalyptus radiata	Narrow-Leaved Peppermint	0.48	0.38	2.43	4.56	16.00	Mature	4.00	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

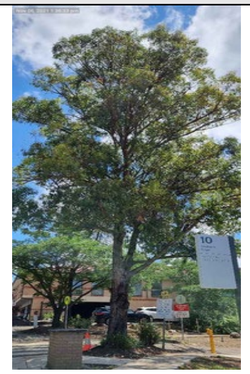
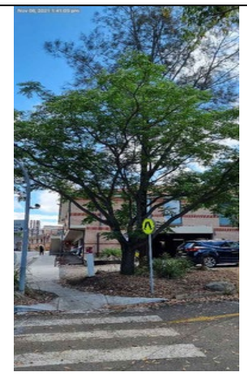
APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
34	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	-	Fair	Fair	Medium	Low	Low	Unaffected	
35	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	-	Fair	Fair	Medium	Low	Low	Unaffected	
36	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	-	Fair	Fair	Medium	Low	Low	Unaffected	

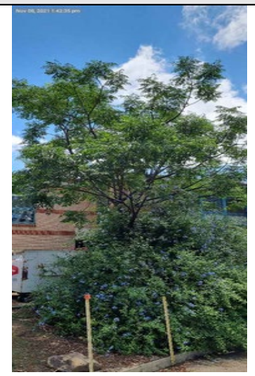
APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
37	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	-	Fair	Fair	Medium	Low	Low	Unaffected	
38	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	100	Fair	Fair	Medium	Low	Low	Remove	
39	Casuarina cunninghamiana	River She-Oak	0.40	0.30	2.25	3.60	16.00	Mature	4.00	100	Fair	Fair	Medium	Low	Low	Remove	

APPENDIX 1 – TREE DATA SCHEDULE

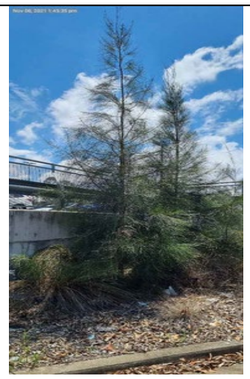
No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
40	Eucalyptus species	Eucalyptus	0.56	0.45	2.59	5.40	15	Mature	5	-	Fair	Fair/Poor	Medium	Low	Low	Assessed as part of the SSDA	
41	Melia azederach	White Cedar	0.40	0.30	2.25	3.60	10	Mature	2	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
42	Casuarina cunninghamiana	River She-Oak	0.38	0.29	2.20	3.48	15	Mature	5	100	Fair	Fair/Poor	Medium	Low	Low	Remove	

APPENDIX 1 – TREE DATA SCHEDULE

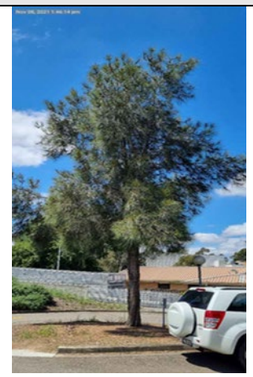
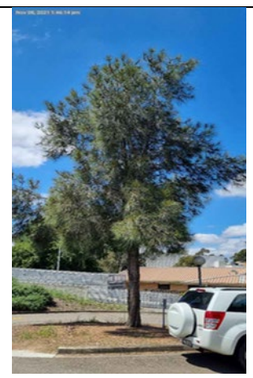
No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
43	Melia azederach	White Cedar	0.20	0.15	1.68	1.80	10	Mature	2	100	Fair	Fair/Poor	Medium	Low	Low	Remove	
44	Corymbia maculata	Spotted Gum	0.40	0.33	2.25	3.96	16	Mature	5	100	Fair	Fair	Medium	Medium	Medium	Remove	
45	Corymbia maculata	Spotted Gum	0.30	0.24	2.00	2.88	16	Mature	5	100	Fair	Fair	Medium	Medium	Medium	Remove	

Tree Management Strategies

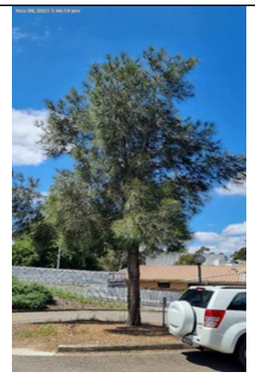
APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
46	Corymbia maculata	Spotted Gum	0.25	0.18	1.85	2.16	16	Mature	5	100	Fair	Fair	Medium	Medium	Medium	Remove	
47	Casuarina cunninghamiana	River She-Oak	0.15	0.10	1.49	1.20	5	Young	1	-	Fair	Fair	Medium	Low	Low	Assessed as part of the SSDA	
48	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	-	Fair	Fair	Medium	Medium	Medium	Assessed as part of the SSDA	

APPENDIX 1 – TREE DATA SCHEDULE

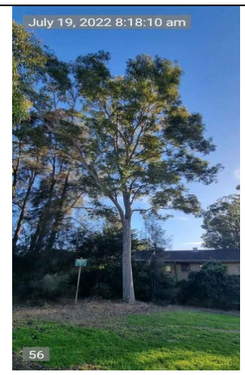
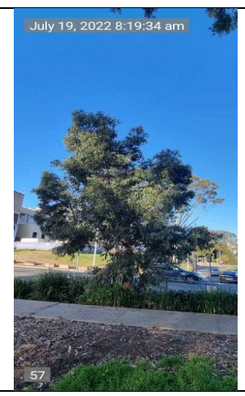
No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
49	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	-	Fair	Fair	Medium	Medium	Medium	Assessed as part of the SSDA	
50	Corymbia citriodora	Lemon Scented Gum	0.45	0.60	2.37	7.20	16	Mature	6	100	Fair	Fair	Medium	Medium	Medium	Remove	
51	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	100	Fair	Fair	Medium	Medium	Medium	Remove	

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
52	Corymbia citriodora	Lemon Scented Gum	0.45	0.60	2.37	7.20	16	Mature	5	-	Fair	Fair	Medium	Medium	Medium	Assessed as part of the SSDA	
53	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	-	Fair	Fair	Medium	Medium	Medium	Assessed as part of the SSDA	
54	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	0	Fair	Fair	Medium	Medium	Medium	Unaffected	

Tree Management Strategies

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
55	Casuarina cunninghamiana	River She-Oak	0.35	0.31	2.13	3.72	16	Mature	5	0	Fair	Fair	Medium	Medium	Medium	Unaffected	
56	Corymbia maculata	Spotted Gum	0.68	0.56	2.81	6.72	18.00	Mature	8.00	0	Fair	Fair	Medium	Medium	High	Assessed as part of the SSDA	
57	Angophora costata	Sydney Red Gum	0.25	0.18	1.85	2.16	10.00	Semi Mature	2.00	0	Fair	Fair/Poor	Medium	Medium	Medium	Assessed as part of the SSDA	

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No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DBH metres (radius) Breast Ht	SRZ (radius) Metres	TPZ (radius) Metres	Height Metres	Age Young, Semi-Mature, Mature Over Mature	Canopy Spread (Metres) (radius)	TPZ incursion %	Health Good Fair Fair/Poor Poor Failed	Condition Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
58	Eucalyptus punctata	Grey Gum	0.25	0.20	1.85	2.40	14.00	Semi Mature	2.00	0	Fair	Fair	Medium	Medium	Medium	Assessed as part of the SSDA	
59	Corymbia maculata	Spotted Gum	0.15	0.13	1.49	1.56	5.00	Young	1.00	0	Fair	Fair	Medium	Low	Low	Assessed as part of the SSDA	
60	Casuarina cunninghamiana	River Oak	0.15	0.13	1.49	1.56	6.00	Young	1.00	0	Fair	Poor	Medium	Low	Low	Assessed as part of the SSDA	

Appendix 2: Tree Impact Plan

313800 313825 313850 313875 313900 313925 313950 313975 314000 314025

6258225 6258200 6258175 6258150 6258125 6258100

LEGEND

- Proposed Site
- Extent of Works
- TPZ - Tree Protection Zone
- Incursion greater than 20%

Proposed Development

- To be demolished (REF)

Retention Value

- Low (13)
- Assessed as part of SSDA (46)

Trees for Removal (REF)

- Low (22)
- Medium (7)

0 4.5 9 13.5 18 m

Scale: 1:620

GDA 1994 MGA Zone 56

6/09/2022

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Mental Health Hospital, Westmead

Tree Impact Plan

APPENDIX 2
Sheet 1 of 3

Tree Management Strategies

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Sheet Size : A3

313825 313850 313875 313900 313925 313950 313975 314000 314025

6258150 6258125 6258100 6258075 6258050 6258025

LEGEND

- Proposed sewer diversion route (Sydney water)
- Proposed Site
- Extent of Works
- TPZ - Tree Protection Zone
- Incursion greater than 20%
- Buildings to be demolished

Proposed Development

- To be demolished (REF)

Retention Value

- Medium (5)
- Assessed as part of SSDA (46)

Trees for Removal (REF)

- Low (22)
- Medium (7)

0 4.5 9 13.5 18 m

Scale: 1:620

GDA 1994 MGA Zone 56

6/09/2022

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INTEGRATED ENVIRONMENTAL MANAGEMENT AUSTRALIA
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Sheet Size : A3

Tree Management Strategies

Mental Health Hospital, Westmead

Tree Impact Plan

APPENDIX 2
Sheet 2 of 3

313725 313750 313775 313800 313825 313850 313875 313900 313925 313950

6258075 6258050 6258025 6258000 6257975 6257950

Group 3
Group 1
Group 2
INSTITUTE ROAD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 40 41 42 43 44 45 46 50 51 52 53 54 55 56 57 58 59 60

0 4.5 9 13.5 18 m
Scale: 1:620

GDA 1994 MGA Zone 56
6/09/2022

LEGEND

- Proposed sewer diversion route (Sydney water)
- Retention basin
- Proposed Site
- Extent of Works
- TPZ - Tree Protection Zone
- Incursion greater than 20%
- Buildings to be demolished

Tree Groups

- Group 1 - 28 Trees for removal Group
- 2 - Assessed as part of SSDA Group
- 3 - Trees to remain

Retention Value

- Group 3 (19)
- Low (13)
- Medium (5)
- Assessed as part of SSDA (46)

Trees for Removal (REF)

- Low (22)
- Medium (7)

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Mental Health Hospital, Westmead

Tree Impact Plan

APPENDIX 2
Sheet 3 of 3

Sheet Size : A3

INTEGRATED ENVIRONMENTAL MANAGEMENT AUSTRALIA
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Tree Management Strategies

Appendix 3: Method

Site Assessment

From the ground, the following information was recorded and displayed in the Tree Data Schedule (Appendix 1).

- Tree genus and species.
- Approximate height spread if deemed applicable.
- Trunk diameter at breast height and above the buttress.
- Age class: young, semi mature, mature, over mature.
- Health.
- Condition.

Observations were recorded and photographed.

Research

The following legislation, documents or websites were reviewed:

- The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009).
- Parramatta City Council Local Environmental Plan (LEP) 2013.
- Parramatta City Council Development Control Plan (DCP) 2011.

Tree Data Schedule Method

The Health and Condition of all trees are shown in the Tree Data Schedule (**Appendix 1**) with the methods explained below:

Tree Health

Overall Health (Vigour/Vitality)	Tree vigour is exhibited by crown density, crown cover, leaf colour, leaf size, leaf texture, presence of epicormic growth, ability to withstand predation by pest and disease, resistance and degree of dieback.
Good (Excellent)	Good tree vigour exhibited by no decline in overall health and vigour, height and shape. The specimen is observed to be of excellent condition displaying characteristics that is known for that particular species (what would be the expected condition for that particular species of that age in that location), 0% dieback, full crown density, leaf health, no pest or disease present.
Fair	Fair tree vigour exhibited by moderate decline in overall health and vigour, height and shape. The specimen is observed to be of moderate condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), less than 10% dieback, 90% of crown foliage density, more than 90% leaf health, acceptable level of pest or disease is evident for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).
Fair/Poor	Fair to poor tree vigour exhibited by considerable decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 10-20% dieback, considerable foliage deficiencies, 70-90% foliage density, 70-90% leaf health, pest or disease infestation at acceptable thresholds for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).
Poor	Poor vigour exhibited by substantial decline in overall health and vigour, height and shape. The specimen is observed to be of poor condition by not displaying characteristics adequately that is known for that particular species (what would be

	expected for that particular species of that age in that location), 20-30% dieback, considerable foliage deficiencies, 50-70% leaf health, pest or disease infestation at unacceptable infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Very Poor	Very poor vigour exhibited by irreversible decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 15-50% dieback; severe foliage deficiencies; 30-50% density; 30-50% leaf health; pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Dead	Dead tree vigour exhibited by complete decline in overall health and vigour, height and shape. The specimen is observed to be dead by not displaying any characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), tree holds less than 15% foliage; branching is dead throughout canopy, pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).

Tree Condition

Overall Condition (Structure/Stability)	The tree condition as identified by the arborist in regard to defects in structure and stability.
Good (Exceptional specimen)	No damage or decay observed to the root plate, visible basal and /or root flare, stable in ground, well tapered branches with sound open unions. All characteristics within thresholds for the assessing arborist.
Fair (Standard tree – no observable major defects to suggest that there is an increased likelihood of tree or part of tree failure)	Minor damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch), well-formed branch unions, minor branch end weight or over-extensions within thresholds for the assessing arborist.
Fair/Poor	Moderate damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch); minimal basal/root flare; acute branch; past branch failure(s); moderate branch end-weight or over-extension approaching thresholds for the assessing arborist.
Poor	Major damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch) no observable basal and /or root flare; acute branch unions starting to include bark; major branch end-weight or over-extension at or exceeds thresholds for the assessing arborist.
Very Poor	Excessive damage or decay observed to root plate, trunk, primary branch or branch unions (1st or 2nd branch order or scaffolding branch), excessive decay or hollows compromising the structural integrity, unstable in ground, excessive branch end-weight, included-bark unions, exceeding thresholds for assessing arborist. Failure probable.
Failed	Failure of root plate or trunk or primary branch or branch unions (1st or 2nd branch order or scaffolding branch) or active split between branch unions or severe damage to primary tree structure.

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

High Significance in landscape

- The tree is in good condition and good vigour. The tree has a form typical for the species.
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age.
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community or listed on a council's Significant Tree Register.
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in fair to good condition and good or low vigour.
- The tree has form typical or atypical of the species.
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area.
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street.
- The tree provides a fair contribution to the visual character and amenity of the local area.
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

Low Significance in landscape

- The tree is in fair to poor condition and good or low vigour.
- The tree has form atypical of the species.
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings.
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area.
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen.
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions.
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms.
- The tree has a wound or defect that has potential to become structurally unsound.
- Environmental Pest/Noxious Weed Species.
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation.
- Hazardous and or Irreversible Decline.
- The tree is structurally unsound and/or unstable and is considered potentially dangerous.
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a mono-cultural stand in entirety.

Useful Life Expectancy (ULE)

Useful life expectancy (ULE) is a measure of a trees remaining lifespan regarding its health, condition and locality ULE categories were measured as:

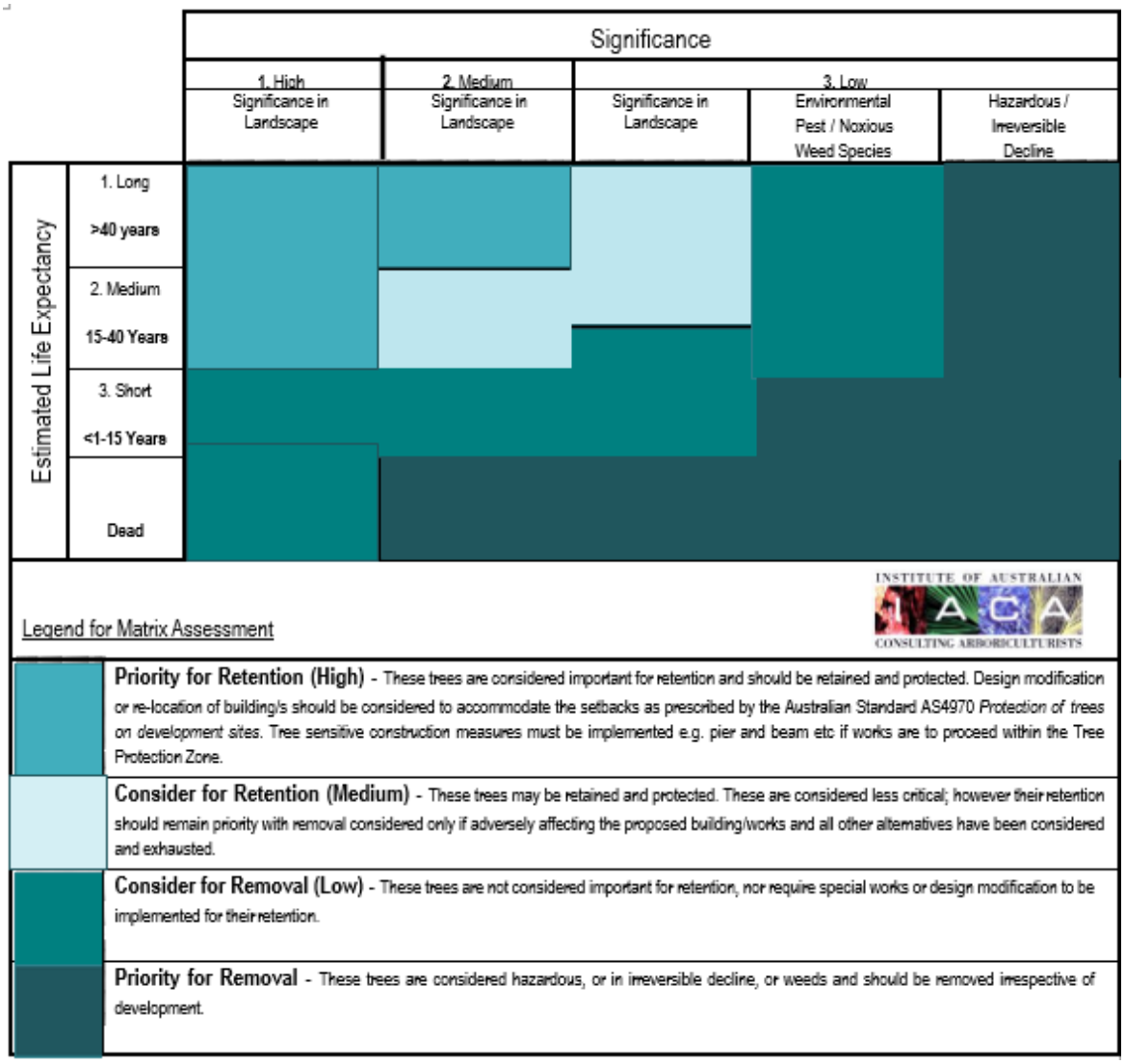
a) Long (greater than 40 years)

b) Medium (between 15 and 40 years)

c) Short (between 1 and 15 years)

d) Dead

Tree Retention Value - Priority Matrix



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Tree Protection Zone and Structural Root Zone Method

Following the VTA, The Tree Preservation Zones and Structural Root zones were calculated and added to the Tree Data Schedule (Appendix 1) and the Tree Impact Plan (Appendix 2) with the methods explained below:

The Structural Root Zone (SRZ) is the area around the base of a tree required for its stability. The woody root growth and soil cohesion in this area are necessary to hold the tree upright; therefore, there are no variations to its size. The SRZ is normally circular with the trunk at its centre and is expressed by its radius in metres (AS – 4970). Due to the potential of causing instability of a tree, it is highly recommended that no roots within its SRZ are pruned or removed. SRZ, which is the area required for tree stability, was calculated as follows: SRZ radius = (D x 50) 0.42 x 0.64.

The Tree Protection Zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area that requires protection. It is an area isolated from construction disturbance, so that the tree remains viable (AS – 4970). The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. TPZ = DBH x 12 (DBH = trunk diameter measured at 1.4m above ground level). The radius of the TPZ is measured from COT (Centre of the trunk).

Variations to the Tree Protection Zone (TPZ)

General
It may be possible to encroach into or make variations to the standard TPZ. Encroachment Includes excavation, compacted fill and machine trenching.

Minor encroachment
If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors. (Figure 6) demonstrates some examples of possible encroachment into the TPZ up to 10% of the area.

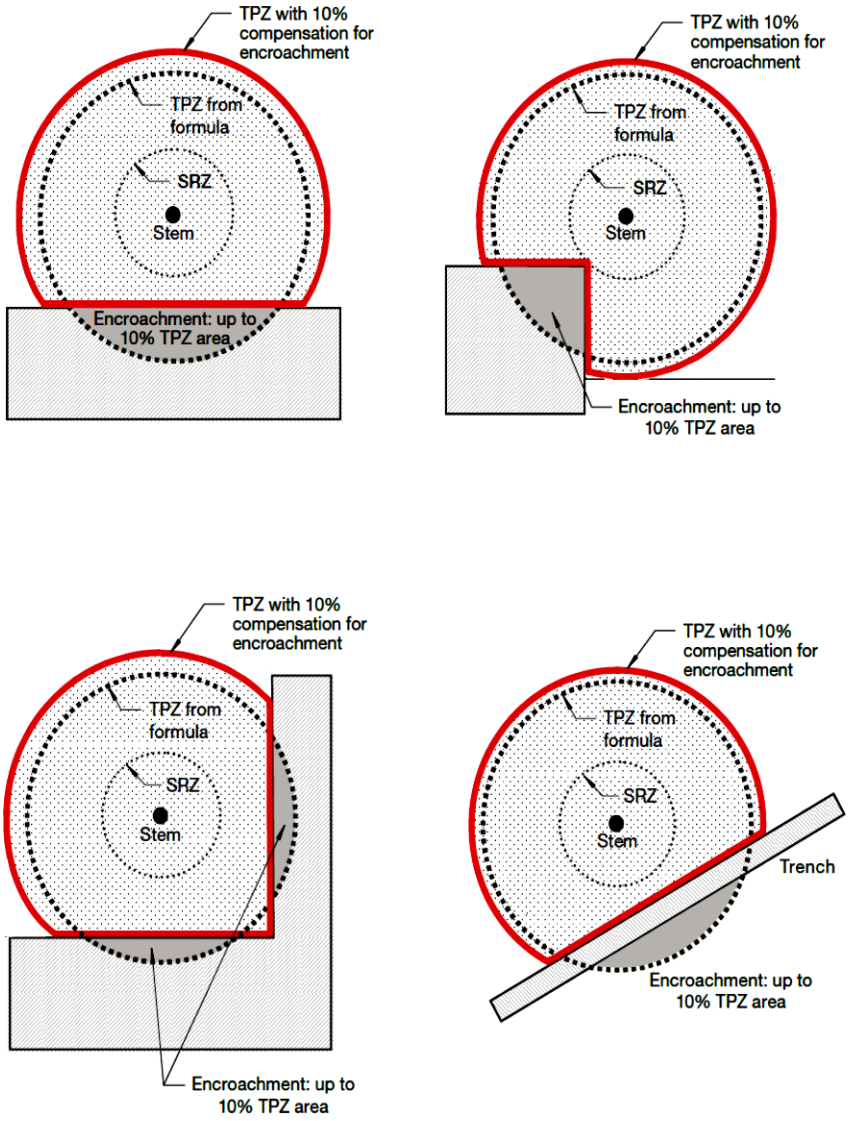
Major encroachment
If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors listed in the Clause.

Figure 6

ENCROACHMENT INTO TREE PROTECTION ZONE

(Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.